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Fact Sheet
August 1, 2019

New Castle County Department of Special Services
187-A Old Churchman's Road
New Castle, Delaware 19720

NPDES Permit No. DE 0050547
Permit No. WPCC 3185G/75

The New Castle County Department of Special Services has applied for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge treated wastewater from its Middletown-Odessa-Townsend Regional Wastewater Treatment Plant (also known as MOT Water Farm No. 1) to the Appoquinimink River.

Proposed Changes

1. Added daily maximum limit for enterococcus.

2. Added Ammonia limits.

3. Added influent monitoring for $CBOD_5$ and TSS to Part I.B.1 to verify that requirements are met regarding 92.5% removal of $CBOD_5$ and TSS.

4. Revised "Reporting" in Part I.D.2. which requires the permittee to submit results via the Department approved Electronically Generated Discharge Monitoring Report (eDMR).

5. Replaced the pretreatment language in Special Condition 2 with updated language provided by EPA.

6. Revised Special Condition 3. by removing the requirement to comply with the Delaware River Basin Commission (DRBC) wasteload allocation for $CBOD_{20}$ since the Appoquinimink River Total Maximum Daily Load (TMDL) wasteload allocation for $CBOD_{20}$ is more stringent. Renamed the special condition and added language regarding reduction of $CBOD_5$ and TSS prior to discharge.

7. Changed biomonitoring "pass" concentration from "13% effluent" to "49% effluent" in Part III.A.5. Revised the dilution series to include the 49% pass threshold.

8. Added new special condition No. 12 pursuant to 40 CFR part 136 to ensure the use of EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits.

Facility Location

The facility is located on County Road 424, east of the Town of Odessa, in Appoquinimink Hundred, New Castle County, Delaware. Its address is 810 Old Corbit Road, Odessa, Delaware 19730.

Activity Description

MOT Water Farm #1 is a publicly owned treatment works (POTW) that serves the Towns of Middletown, Odessa and Townsend and the contiguous unincorporated areas of the County. The wastewater treated at the facility is from domestic and commercial sources. There are no industries or industrial users within the treatment plant's service area. There are two industries located in the Town of Middletown (Johnson Controls and MacDermid Imaging) that had previously (prior to October of 2002) been served by the M-O-T Regional Wastewater Treatment Plant, but are now served by the Town of Middletown's treatment (spray irrigation) facility. Nonetheless, the County maintains a pretreatment program that encompasses the County's entire wastewater infrastructure (the wastewater conveyance network located throughout northern New Castle County and the conveyance and treatment systems that serve Delaware City, Port Penn and southern New Castle County (M-O-T's service area)).

The facility provides an advanced level of wastewater treatment. The facility is unique in that the effluent from the treatment plant is used to irrigate crops on County lands adjacent to the treatment plant. When effluent cannot be used to irrigate the lands, it is discharged to the Appoquinimink River, subject to the terms and conditions of the County's NPDES discharge permit.

The average daily design flow of the treatment works is 2.5 mgd. The peak design flow of the treatment works is also 2.5 mgd. The treatment processes include influent screening using two internally fed drum screens, equalization of the screened effluent, biological treatment (two trains of sequencing batch reactors capable of providing biological nutrient removal), tertiary filtration (cloth filters) and ultraviolet disinfection. The biosolids that are generated during the course of treatment are aerobically digested and stored on-site in a lined lagoon equipped with surface aerators. The plant also has influent and effluent flow metering and chemical feed systems and a lined lagoon for the storage of treated effluent.
All sewers within M-O-T's service area are separate sanitary sewers; there are no combined sewers (i.e. sewers that purposefully collect both storm runoff and sanitary sewage flows). Consequently, there are no CSOs or combined sewer overflows.

The facility has a design flow of more than one million gallons per day and serves a population of more than10,000 and therefore designated as a **major** POTW.

Discharge Description

Four discharges are identified and described in the draft permit, on page 2 of 21 pages. Outfall 001 conveys the effluent from the wastewater treatment plant to the Appoquinimink River. Storm runoff is channeled and conveyed through three storm water point sources: Outfalls 002, 003 and 004. The storm water outfalls 002, 003 and 004 are sheet flows into swales.

Storm water runoff from municipal wastewater treatment works (facilities that treat domestic sewage) with a design flow of one million gallons per day (1.0 mgd) or more is considered a storm water discharge "associated with industrial activities" and as such, must be sanctioned by an NPDES permit. Precipitation and storm runoff may come into contact with materials associated with the operation of the treatment works and transport those materials offsite via runoff. M-O-T's design flow exceeds the 1.0 mgd threshold.

New Castle County sought coverage under the Department's NPDES General Permit Program and submitted a "Notification of Intent" form (an "NOI") for the storm water discharges from its M-O-T treatment facility. The County also prepared and continues to maintain a Storm Water Pollution Prevention Plan; a copy of the County's original and updated storm water plan is on file. The plan identifies three storm water outfalls at the site. "Outfall 1" drains an area that includes the parking lot, chemical (alum) storage, a building that houses a portion of the treatment works, an above ground storage tank for diesel fuel and a transformer. Storm runoff flows in a northerly direction. "Outfall 2" drains an area that houses the maintenance building and an above ground storage tank for diesel fuel. Storm runoff flows off-site in a westerly-southwesterly direction. "Outfall 3" drains an area that includes the

dumpsters and the equipment storage barn. Storm runoff flows off-site as sheet flow in an easterly-southeasterly direction. To minimize confusion with the effluent discharged through Outfall 001, the three storm water outfalls are renumbered Outfalls 002, 003 and 004 respectively.

Receiving Stream Classification

The Appoquinimink River in the vicinity of the discharge is tidally-influenced fresh water. The designated uses for this portion of the river include: industrial water supply; primary and secondary contact recreation; the protection and propagation of fish, aquatic life and wildlife; and agricultural water supply.

Statutory and Regulatory Basis

The Delaware Department of Natural Resources and Environmental Control (DNREC) proposes to reissue an NPDES permit to discharge the wastewater subject to certain effluent discharge limitations, monitoring requirements and other terms and conditions identified in the permit. Section 402 of the federal Clean Water Act, as amended, and 7 Del. C. Chapter 60 provides the authority for permit issuance. Federal and state regulations promulgated pursuant to these statutes are the regulatory bases for permit issuance.

Bases for Effluent Limitations

DNREC has examined the application, recent discharge monitoring data, and related information. The Department proposes to reissue the facility's NPDES permit for a period not to exceed five (5) years, subject to the effluent discharge limitations and monitoring requirements shown in the attached copy of the draft permit.

The proposed discharge/effluent limitations for the treated wastewater from New Castle County's M-O-T Regional Wastewater Treatment Plant (Outfall 001) are expressed in both numeric and narrative terms.

The proposed effluent limitations for pH, enterococcus, 5-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN) are being retained from the current permit. The current limits provide sufficient safeguards to ensure that any discharges from MOT's Water Farm No. 1 meet 1) the Department's required minimum technology standards 2) satisfy all applicable surface water quality standards and 3) protect the receiving waters' designated uses.

The following table outlines the bases for the proposed effluent limitations for Outfall 001:

Parameter	Water Quality-Based[1]	Technology-based	
		DRBC[2]	RGCWP[3]
pH			✓
Enterococcus		✓	
$CBOD_5$	✓		
Total Suspended Solids			✓
Total Phosphorus	✓		
Total Kjeldahl Nitrogen	✓		
Ammonia (as N)	✓		
Biomonitoring	✓		
"Free From ... "	✓		

1 State of Delaware Surface Water Quality Standards (**SWQS**).
2 Delaware River Basin Commission Water Quality Regulations.
3 State of Delaware Regulations Governing the Control of Water Pollution (**RGCWP**).

pH and Total Suspended Solids (TSS)

The pH and Total Suspended Solids (TSS) limits are technology-based, in accordance with Section 7 of the Department's *Regulations Governing the Control of Water Pollution*. The once weekly monitoring requirement has been retained.

Enterococcus

The enterococcus daily average limitation is also technology-based, in accordance with the Delaware River Basin Commission's (DRBC's) Water Quality Regulations for the effective disinfection of secondary treatment plant effluents. In a letter dated July 30, 1999 to the Department, DRBC approved the enterococcus effluent limit as an equivalent alternative to the fecal coliform limit in DRBC's Water Quality Regulations. This limit is protective of the receiving waters' contact recreational uses as it is more stringent than the bacterial surface water quality criterion for primary contact recreation in both fresh waters (100 col/100 mL, as a geometric mean) and in marine waters (35 col/100 mL, as a geometric mean). It is also more stringent than the wasteload allocation (35 col/100 mL, as a geometric mean) for the M-O-T Regional Wastewater Treatment Facilities established in the nutrient Total Maximum Daily Load (TMDL) Regulation for Appoquinimink River Watershed.

A daily maximum limitation of 185 col/100ml based on the bacterial surface water quality criterion for primary contact recreation in fresh waters, has been added.

$CBOD_5$, Total Phosphorus (TP) and Total Kjeldahl Nitrogen (TKN)

The effluent limitations for $CBOD_5$, TP and TKN are water quality-based, in accordance with the wasteload allocations for the M-O-T Regional Wastewater Treatment Facilities established in the nutrient Total Maximum Daily Load (TMDL) that was promulgated by the United States Environmental Protection Agency for the Appoquinimink River. The $CBOD_5$ wasteload allocation established in the Appoquinimink River TMDL is more stringent than the $CBOD_5$ wasteload allocation equivalent to the Delaware River Basin Commission's $CBOD_{20}$ wasteload allocation.

While Delaware's *Surface Water Quality Standards* (SWQS) presently recognize nutrient overenrichment as a significant problem in some surface waters of the State, numeric nutrient criteria for streams in the Appoquinimink River basin are not defined. Of the components of instream biological activity, only dissolved oxygen (DO) concentrations are included in the surface water quality standards. As a result, the nutrient TMDL endpoint is based on both the minimum instantaneous and minimum daily average DO for the critical summer period (June through September).

The wasteload allocations for the M-O-T facilities in the Appoquinimink's TMDL are based on a 30 day or monthly average flow of 500,000 gallons per day (0.5 mgd). The daily volume of wastewater discharge is controlled indirectly through the proposed monthly or daily average and daily maximum loading limitations.

In addition, a provision is included that the influent $CBOD_5/BOD_5$ and TSS of the raw waste be reduced by at least 92.5 percent as a 30 day or monthly average prior to discharge to address the minimum level of treatment required of facilities that employ secondary treatment, filtration and disinfection, as outlined in Section 7.7.3 of the Department's *Regulations Governing the Control of Water Pollution*. This requirement is more stringent than DRBC's Water Quality Zone 5 $CBOD_5/BOD_5$ % removal requirement of 87.5%.

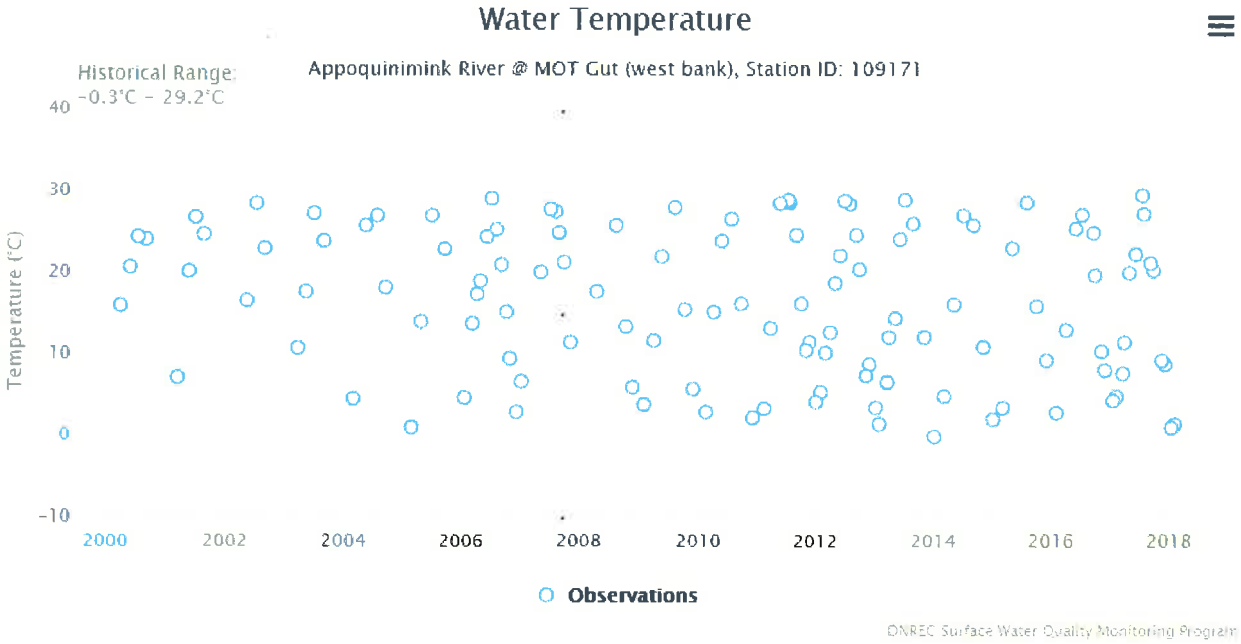
The proposed effluent limitations for Outfall 001 include a narrative provision that is consistent with the Department's *Surface Water Quality Standards*: "The discharge shall be free from floating solids, sludge deposits, debris, oil and scum."

The current monitoring requirements are being retained. In addition, monitoring (analyses and reporting) of Total Nitrogen, which involves the measurement and reporting of effluent nitrite and nitrate concentrations, and which was proposed to foster a better understanding of the facility's nutrient load and its ability to remove nitrogen is being retained as well.

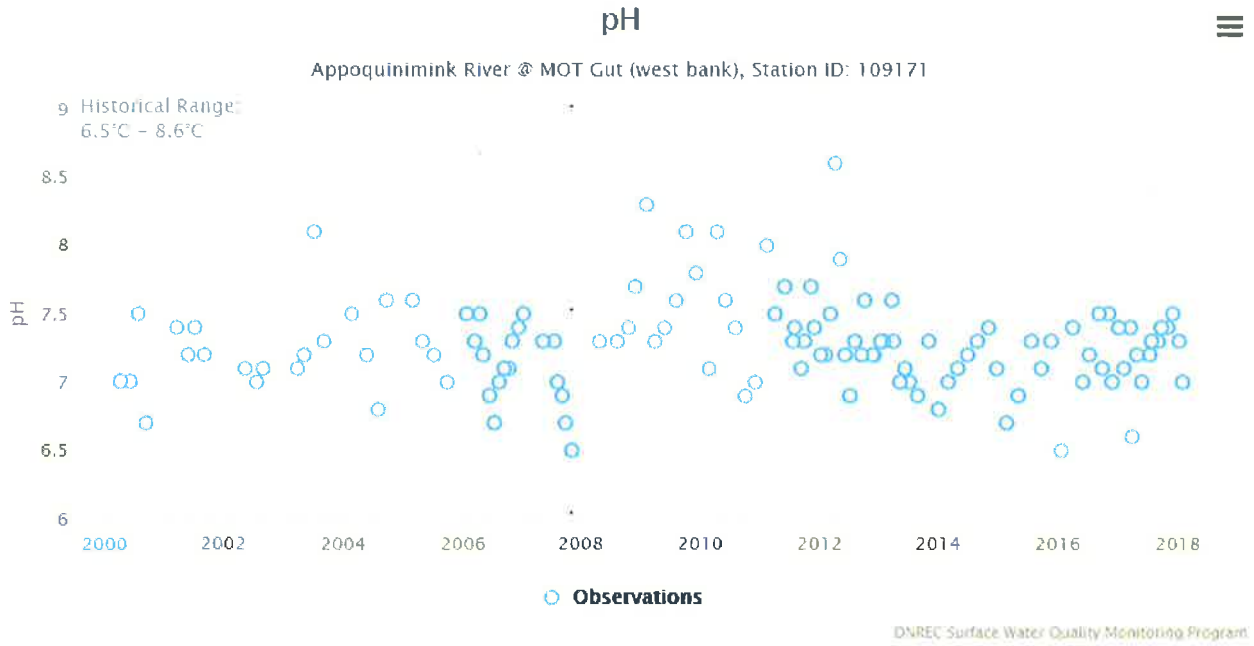
Ammonia

The State of Delaware Surface Water Quality Standards (SWQS) have ammonia criteria for acute (i.e., 1 hour exposure) and chronic (4-day exposure) toxicity. The acute ammonia criterion is calculated based on pH. The chronic ammonia criterion is calculated based on both pH and temperature. For acute criterion, there are different calculations depending on presence of salmonid fish in the receiving water body. The acute criterion in the case where salmonid fish are present is stricter than in the case where salmonid fish are not present. Similarly, for chronic criterion, there are different calculations depending on the presence of fish early life stages in the receiving water body. The chronic criterion in the case where fish early life stages are present is stricter than in the case where fish early life stages are not present. Without sufficient information on the presence of salmonid fish and fish early life stages in Appoquinimink River, a conservative approach of calculating the acute and chronic criteria is taken i.e. salmonid fish and fish early life stages present.

To determine reasonable pH and temperature ranges to evaluate the potential for ammonia toxicity, the following Figures show historical ranges for instream pH & temperature at Station ID 109171 just downstream of MOT.[1]



[1] http://demac.udel.edu/waterquality/



The acute criterion becomes stricter as pH increases. The chronic criterion becomes stricter as both pH and temperature increase. During the TMDL development for Appoquinimink River, the mean, 75th percentile, and 90th percentile pH values were used to perform analysis to ensure that the ammonia water quality criteria was not exceeded in the Appoquinimink River Watershed. In determining the ammonia criteria for this draft permit, the 99th percentile of the historical stream pH values was used to calculate the acute criterion. The historical paired pH and temperature values were used to calculate a set of chronic criteria. The 1st percentile of the calculated set of chronic criteria was used as the single chronic criterion.

The "Technical Support Document for Water Quality-based Toxics Control"[1] (TSD) provides a methodology for a "Reasonable Potential" (RP) Analysis to identify if a pollutant has a reasonable potential to cause or contribute to water quality problems in the receiving waters. The RP Analysis uses data from renewal applications and monthly electronic Discharge Monitoring Reports (eDMR) and compares them to all applicable technology-based standards and State water quality standards. When multiple technology and water-quality based standards exist for a specific pollutant, the NPDES permit limit is based upon the requirement that results in the strictest limit. RP analysis was performed by comparing the highest ammonia discharge concentration provided in the permit application to the applicable criteria discussed above. The allowed dilution in the receiving water was accounted for in the analysis. The applicable dilution was determined based on the critical flows for the Appoqunimink River and a projected maximum effluent flow. 7Q10 flow at a USGS station (Station 01483150) upstream of MOT was extrapolated to approximate the 7Q10 flow at MOT using the "Drainage-Area Ratio method". 99th percentile of the last 5 years of effluent flow data was used as the projected maximum effluent flow. The analysis determined that there was a reasonable potential for the discharge to exceed the criteria and therefore ammonia limits have been established. The limits are based on the ammonia criteria for protection of aquatic life discussed above.

Biomonitoring

The current permit has a 13% "pass" criteria for whole effluent toxicity (WET) testing. Normally, the "pass" concentration for a WET test is based on the "Instream Waste Concentration" (IWC) of the effluent at the edge of the "Regulatory Mixing Zone" (RMZ). The 13% IWC was established years before the facility was upgraded to increase its design flow capacity. As described above, critical flows for the Appoqunimink River and a projected maximum effluent flow have been used to calculate allowable dilutions (acute and

[1] U.S.E.P.A., Office of Water (EN-336), March, 1991, EPA/505/2-90-001, PB91-127415

chronic dilution factors). Based on these calculations, the draft permit proposes an IWC of 49% (IWC is inverse of chronic dilution factor) as the pass criteria for chronic WET testing. This requirement is more stringent than the requirement in the current permit. Consequently, the dilution series used to perform the test has been revised to include the 49% IWC. Additionally, since the recent NOEC test results have been 100% and considering that NOEC values are limited to one of the effluent concentrations in the test, the series has been selected such that the IWC is 2nd in the dilution series as opposed to the typical 3rd (38.6%, 49%, 62.2%, 78.8% and 100%). There are now more dilution samples between the IWC and 100% effluent in order to produce more reliable and precise results. Based on the annual biomonitoring reports submitted in the last 10 years (2009 - 2018), the NOEC test results have been consistently 100%. All the IC25 test results have been >100% with the exception of 2013 (c. dubia of 87.5% and 76.25% for survival and reproduction). Based on these results, the coefficient of variation (CV) is very small and so is the corresponding reasonable potential multiplying factor (RPMF). Accounting for allowed dilution, the discharge does not demonstrate a reasonable potential to exceed chronic WET criterion. MOT has had very good compliance with the chronic biomonitoring requirements and therefore the minimum monitoring requirement of once per year has been retained.

Wet Weather Discharges

To address the storm water discharges and the potential transport of materials or contaminants associated with the operation of the County's wastewater treatment plant, the draft permit includes a narrative provision (in Part III. A. Special Condition No. 11 on page 21 of 22) that states, "Only storm water may be discharged from Outfalls 002, 003 and 004; these storm water discharges are to be free of floating solids, sludge deposits, debris, oil and scum". Similar provisions are included in other individual NPDES storm water permits. These assurances are designed to protect the receiving waters and to enable them to maintain compliance with the Department's *Surface Water Quality Standards*. Special Condition No. 11 also obligates the County to "continue to implement and maintain a Storm Water Plan (SWP) that is designed to limit the exposure of industrial materials and activities to precipitation and to minimize the discharge of contaminated storm water from the permittee's facility." The SWP is to be implemented and maintained in accordance with the requirements outlined in Section 9.1.5 of the Department's *Regulations Governing the Control of Water Pollution*.

Special Conditions

Special Condition No. 1 states that this permit supersedes NPDES Permit DE0050547 and State Permit WPCC 3185F/75 issued on October 3, 2012 with a November 1, 2012, effective date.

Special Condition No. 2 outlines the requirement for operation and implementation of a pretreatment program. Currently, the facility does not have, nor is it required to have, a pretreatment program. Notification is required if this situation changes.

Special Condition No. 3 requires the permittee to demonstrate a minimum of 92.5% reduction in the raw waste TSS and $CBOD_5$ concentrations on a monthly average basis prior to discharge.

Special Condition No. 4 outlines the effluent limitations for Total Kjeldahl Nitrogen (TKN) and the methodology to be used in calculating and reporting the moving twelve-month cumulative load for TKN.

Special Condition No. 5 outlines the yearly whole effluent toxicity testing (chronic biomonitoring) requirement. The permittee is to perform EPA chronic test methods 1000.0 Pimphales promelas Larval Survival and Growth Test, and 1002.0 Ceriodaphnia Survival and Reproduction Test simultaneously and report the results to the Department.

Special Condition No. 6 states the operation of the permittee's wastewater treatment plant is to be under the direct supervision of a Delaware licensed/certified wastewater operator in Direct Responsible Charge (DRC), as required by State law and the Department's *Regulations for Licensing of Wastewater Operators*.

Special Condition Nos. 7, 8 and 9 require proper disposal of sludge in accordance with State and Federal requirements.

Special Condition No. 9 outlines wastewater treatment plant operator licensing requirements for this facility.

Special Condition No. 10 is a standard permit clause which provides for reopening the permit to address water quality concerns.

Special Condition No. 11 pertains to the discharges of storm water runoff from the site requiring the permittee to implement and maintain a Storm Water Plan.

Special Condition No. 12 requires the permittee to use EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits pursuant to 40 CFR Part 136.

Antidegradation Statement

Except where otherwise noted herein, the proposed effluent limitations included in this NPDES permit comply with the applicable portions of the State of Delaware Surface Water Quality Standards, Section 5: Antidegradation and ERES Waters Policies.

Public Notice Comments and Responses

Two comments were received from EPA. The first comment was a request to replace the pretreatment language in Special Condition 2 with updated language. The language has been replaced with updated pretreatment language provided by EPA. The second comment was related to incorrect page referencing which has been corrected.

Public Notice and Process for Reaching a Final Decision

The public notice of the Department's receipt of the application and of reaching the tentative determinations outlined herein was published in the Wilmington News Journal and the Delaware State News on **May 19, 2019**. Interested persons were invited to submit their written views on the draft permit and the tentative determinations made with respect to this NPDES permit application. The Department did not hold a public hearing on this application as the Department did not receive a meritorious request to do so nor did the notice of this proposal generate any public interest. The Department received comments from EPA. The comments received were considered and addressed by the Department in preparing the final permit.

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